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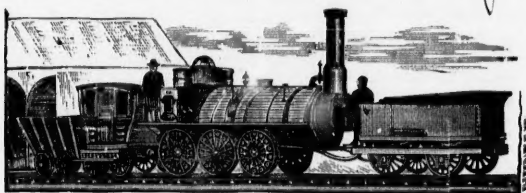
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**Canadian Society of Civil Engineers.**

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(To be read on Thursday the ~~10th~~ December) 21 Jan



**ONE OF THE OLDEST RAIL ROADS IN CANADA.**

By H. S. POOLE, M. CAN. SOC. C. E.

In 1818, when coal mines were first opened on the East River of Pictou, a tram road was made from the pits to the head of the tide, above where the iron railway bridge now spans the river; but shipments were small until a transfer of the property took place in 1827, when a new site for the wharves was selected lower down the river.

As the trade grew and the inconvenience of shipping in shallow waters was more and more felt, other sites still lower down were found, and so it came about that in the course of ten years four moves were made.

The tram road was of the now standard gauge, 4' 8½", and was worked by horses. Sidings were placed about half a mile apart, and each horse went his half mile or so with a full load, and, leaving it on the main line for the next horse to take on, returned with empty wagons from the siding.

When in 1834, it was found that much improved facilities were required to meet the growing trade, the final site was selected opposite the loading ground, some four or five miles further down the river from the shipping place in use, at a point where there was ample water for vessels of the largest size then engaged in the coal trade.

The extension then decided on was subsequently built in a more substantial manner than the upper part of the road had been made. It was finished in 1838, and in that year the first locomotive ran over a railroad in British North America.

For half a century this rail road was in operation, and for many years carried passengers as well as freight; it was finally abandoned last autumn, and the shipping of coal transferred from the loading ground where this South Pictou Railroad terminated, to wharves at the mouth of the harbour, access to which is attained over a branch of the Inter-colonial Railway to Pictou Landing. These newer wharves will accommodate any vessel that can cross the bar at the harbour's mouth, they are accessible earlier and later in the season than those at the loading ground, and from them loaded vessels can sail at any time of the tide day or night.

When the tram road gave place to the rail road, the line to the pits was also changed, and the whole length of seven miles came under new surveys.

The President of this society has spoken of the desirability of recording the names of those who were pioneers in the several branches of the profession of engineering, and the author now would name Mr. Peter Crerar as the first Railroad engineer in Nova Scotia if not in Canada.

Mr. Crerar was born in 1785 at Bredalbane in Perthshire, and came to Nova Scotia in 1817. He first taught in a school and then became deputy land surveyor, in which latter capacity he laid out several of what are now the main roads in Pictou County. He died in 1857.

Mr. Crerar \*had had no experience in railroad surveying and building, prior to the time he was engaged to run the trial lines of the extension of the South Picton Railroad; yet when his plans and specifications were laid before the Board of Directors "at home," they were so well satisfied with them, that they wrote out, saying: "What need is there of our sending you an engineer when you have Mr. Crerar in the country? Let him supervise the construction." This was accordingly done, and several of the sections he prepared to show the progress of the work have been preserved. One of these sections the author is, by the kindness of Mr. Clendenin, the President of the Acadia Coal Company, the present owners of the property, enabled herewith to send for preservation in the archives of the Society.

A glance at Mr. Crerar's section is arrested by the unusual uniformity of the grade for a road passing through a country so uneven as there shown, so different from that ordinarily met with on colliery railways built in the present day. The road starts from the pits with a falling grade of one in 437 feet for a distance of 3500 feet, thence it is practically level for 18,770 feet, a slight incline of one in 578 feet then follows for 2,500 feet, succeeded by a level piece of road for 5,810 feet; a grade of one in 360 feet for 1,500 feet then takes the road to the timber structure, in connection with the wharf 16½ feet above ordinary high tide.

It will also be noticed on the plan of the road that in the matter of curves, great caution has been shown; as even when it entailed extra cutting of considerable amount, nowhere is there a curve of over 4 degrees radius.

The cuttings and embankments were both made with a slope of one and a half to one; the former being made 18 feet wide at the bottom, and the latter of the same width at the top.

Among the papers relating to the construction of the road is the following memorandum, connected with the first line in England intended for general traffic.

"The Liverpool and Manchester Rail Road.

Iron Rail Road account £67,912.0.0.

"The above expenditure comprises the following items: Rail for a double way from Liverpool to Manchester, with occasional lines of communication and additional side lines at the different depots, being about 35 miles of double way = 3,847 tons, at prices averaging something less than £12.10.0. per ton."

In addition to the interest which this memorandum has as a statement of cost, the author would specially draw attention to the use in it of the words "depot" and "rail road." Their use here makes it probable that these words were common in England at the time in question, although they have been there abandoned and replaced by "station" and "railway."

It would appear probable that these terms were at the same time adopted in America, but in contradistinction to the English practice, they were retained there just as philologists tell us many words and expressions, which are distinctive of New England to-day, are recollections of Puritan times, and are not indigenous to the soil. Only the other day, a reviewer, writing on the great American language, gave "depot" as an adaptation from the French direct by the people of America; but it would seem that the use of that word in the foregoing memorandum points to its having had at least a temporary resting place in England on its way to America.

It may be noted that in all the papers connected with the South Picton road, the invariable practice is to speak of it as a "rail road," never as a "railroad" or "railway," and this spelling the author has retained in this paper.

The road has, as already mentioned, a gauge of 4' 8½," as was the practice in England at the time of its building. The rails were of several sections of which pieces have been sent to the museum of the Society, the earliest form was scalloped to sit in metal chairs spiked to sleepers placed 3 feet apart. The turnouts are made with tongues or split points of the form now required by the British Board of Trade, and one which has of late grown more in favor in America than the facing points ordinarily seen.

\*In some papers he signs himself "Geographic Engineer."

**Locomotives:**—The first engine to run on the road was the Samson, which is still in working order and was in use until 1884. This engine led in the procession of locomotives at the Chicago exhibition in 1883, and was driven by George Davidson, who came out with it from England in 1838.

The John Buddle and the Hercules were imported at the same time, and were similarly constructed; they were followed by the Albion and Pietou, which have inclined cylinders and tubular boilers, and subsequently in 1853 by the Vulcan, which has the cylinders placed horizontally.

The boiler of the John Buddle is now used to drive a stationary engine, and the others are not beyond repair if use could be found for them. The veteran Samson is waiting for a purchaser\* who will preserve it as a relic of past practice. It was built by Timothy Hackworth of Newcastle, weighs 16 tons, 19 cwt., 0 gr., 20 lbs., and with duplicate wheels and other parts cost £2140. Cy.

The cylinders are 15½" diameter with a stroke of 16" and a valve area of 2¼ sq. ins. They sit vertically over the hind driving wheels, and have Watt's parallel motion instead of crossheads and slides. The wheels are 4' in diameter, six in number, with a wheel base of 8' 8"; they are made in two pieces, the annular portion is kept in position round the central hub by twelve circular keys of wood.

The boiler with a capacity of 540 gallons has a length of 13' 4", and carried a pressure of 60 lbs. on the square inch. It has a single return flue of 3" plate, single rivetted, 26½" in diameter round the fire, and diminishing to 18" where it enters the smoke box. As constructed the tender goes in front, and the stoker alone attends to the firing, while the driver sits in an iron chair behind his engine.

The author among the notes of his father, who managed the Albion Mines for the General Mining Association for fourteen years, finds a careful record of the work done by each locomotive; and between the years 1840 and 1853, the Samson on an average in each year was out 113 days, ran 4721 miles a year, and hauled 21,913 chaldrons of coal, at an average annual cost of £61.9s. 6d. cy. \* for repairs, and £227. 13s. 2d. Cy. for working expenses.

**Cost of material and work.**—The author has come across a few items of cost with which material and work of to-day may be compared, e.g., The actual cost of earth cuttings per yard ranged from ten pence to one shilling and three pence, 62,297 yards costing £3247.7s. 5d. In later work the rate paid was even lower, and down to 5½d. per cubic yard for levelling a coal floor. At the present time, cuttings through the same class of ground, stiff boulder clay with embedded rocks and pebbles, could not be made under thirty cents per cubic yard.

Spruce 1½" and 2" boards were bought for 22 shillings per thousand; hemlock at nineteen and six pence.

Hemlock logs not less than 15" diameter as follows:—

27	logs	36	feet	long	each	at	4s. 6d.
297	"	25	"	"	"	"	3s.
54	"	24	"	"	"	"	2s. 10d.
567	"	19	"	"	"	"	2s. 5d.
1356	"	13	"	"	"	"	1s. 9d. in all £233.0s. 9d.

Cedar sleepers from New Brunswick were delivered at 2s. each in 1846, and at from 1s. 9d. to 2s. 6d. in 1847.

Iron rails, 21,149 yards, weighed 617 tons 14 cwt., and required 258 tons 2 cwt. of metal chairs and 35 tons 17 cwt. of pins and wedges.

As an example of stone work take the cost in 1850 of a culvert 4 feet in diameter, 143 feet long, under an embankment 35 feet high.

Finding and hauling stone 9 miles at..... 10s. 6d. per c. yd.

Building same..... 4s. " "

Face dressing inside of culvert and including reducing the stone to the mould of the arch 18" thick, stones 7" at face, 11" at back at..... 12s. 6d. " "

Then a retaining wall 90 feet long by 24 feet high, 7 feet thick at the bottom, and 4 feet 3 inches wide at the top was built, the slope found and the face chisel dressed for 12s. 6d. per cubic yard.

\* Price asked \$5000.

\* The £1 Cy. was worth 16s. stg.

The author has not been able to make out the actual first cost of the road, but in after years the valuation inclusive of land damages and engines stood at £76,700.1s. 0d.

The following however is the estimate by Mr. Crerar of the probable expense of completing the Albion Mines Rail Road, from its commencement at the Foundry to its termination at the Loading ground :—

Currency	
Excavating 135,980 cubic yards @ 1s. 2½d. ....	£8882.2.6
21,600 Tons prepared stones laid on @ 6s. 6d. per ton. ....	7020 0 0
10,560 sleepers @ 1s. 3d. each .....	660 0 0
Laying down same and rails, &c .....	660 0 0
A bridge at Simon Fraser's Cove, stone abutments each averaging 30 ft. high, wooden tops supported by wooden piers or pier poles, &c., &c. ....	447.0.0
A bridge across Cove Brook, &c., &c. ....	579.0.0
A bridge from Dunbar's Point to Loading ground one stone abutment, &c. ....	1593.0.0
15 bridges and passing places, stone abutments, wooden tops, averaging 20 ft. high and 15 ft. span, at £180 each.....	2700.0.0
Drains and Culverts.....	800.0.0
600 Tons Iron rails, chairs, etc., @ £15 per ton.....	9000.0.0
	<u>32341.2.6</u>
Ten per Cent. Contingencies .....	3234.2.3
	<u>£ 35575.4.9</u>

Having located the line, the next step was to obtain the right of way and as in those days there was no Railway Act, it may be of interest to note what proceedings were actually taken.

First application was made to the General Sessions of the county, and then in accordance with the authority there obtained there was issued the following notice and in due course the Jury's award.

NOTICE is hereby given that pursuant to an order of the Justices of the General Sessions of the Peace for the County of Pictou, dated the 4th day of January instant, made upon the application of the General Mining Association, which Association are the sublessees of His Majesty's mines in the Province of Nova Scotia, by Joseph Smith, Esquire, their agent and attorney, a precept in writing has been issued, directed to the Sheriff of the county of Pictou, or his deputy, commanding him to summon certain persons being freeholders to appear at the house of James Fraser, innkeeper in the town of New Glasgow, on Tuesday, the 4th day of April next ensuing, at 11 o'clock forenoon, for the purpose of laying out and setting off within the lands of any person or persons owning the same, or in possession thereof, so much of the said land as may be required for the purpose of altering the line of rail road, now in use at the Albion Mines on the East River of Pictou, in the county aforesaid, the whole way from the shafts or pits at the said mines, down the west side of the said river to some convenient point opposite to what is generally called the "Loading Ground," and for assessing the damages to the owner or owners, tenant or tenants of such lands, according to their several interests for being deprived of the use and benefit thereof; and for the expense of making fences or ditches, and also for fixing and ascertaining the annual rents for the use and occupation of the said lands, in accordance with the laws of the Province in such case made and provided.

(Signed,) JAS. MINNESTER,  
Clerk of the Sessions.

Pictou, January 6th, 1837.

"At the house of James Fraser, Innkeeper in the Town of New Glasgow, this sixth day of May, one thousand eight hundred and thirty-four.

A list or panel of the names of twelve of the freeholders summoned and in attendance, under and by virtue of the precept hereto annexed, who on the list of freeholders to the said precept annexed being called over first appeared and answered thereon, and who were thereupon sworn by me the subscriber, John W. Harris, the deputy of John J. Sawyer, Esquire, sheriff of the County of Halifax, as a jury to the faith-

ful discharge of the duties required of them by the laws of the Province, touching the several matters and things in the said precept mentioned and set forth namely:—(Alexander McDonald and others.)

VERDICT OR FINDING OF THE ABOVE JURY.

We whose names are hereto subscribed, being the jurors named in the above list or panel, do hereby certify, that being first duly sworn we proceeded to the discharge of the duties imposed on us, and having traversed the line proposed by the agents of the trustees of the General Mining Association, as an extension of the rail road from the shafts or pits at the Albion Mines on the East river of Pictou, the whole way from the said shafts or pits down the west side of said river, to a point in said river opposite to what is called the loading ground, as shown to us by the said agents of said trustees, and having heard all such parties interested therein, as well for as against their several proofs, opinions, plans, estimates and suggestions as appeared before us, and having again by ourselves, separate and apart from all interested therein, given the whole business referred to us our most mature deliberation, do say that in our judgment it is needful and requisite to extend the said line of rail road the whole way from the said shafts or pits, to a point or place in the said East river of Pictou, opposite to the said loading ground, that being the nearest sea water navigable for loaded ships or vessels of any size in the said river; and that for the purpose of so extending the said rail road, it is needful and necessary to open and make the same across and in front of the lands lying on the west side of the said river, between the said shafts or pits and the said loading ground, on the several courses as shown upon the plans hereunto annexed, which plans are made and signed by Peter Crerar, deputy land surveyor and civil engineer, and thereupon for that purpose we do hereby lay out and make as the same is now marked and staked on the ground, and shown upon the said plan, through, over and within the lands following, that is to say commencing at or near the foundry, that being a short distance from the said shafts and pits, and to which place the said rail road has been previously laid down and established as we are informed, and running from thence through, over, and within the lands now in the possession of the said General Mining Association, one John Duff, one William Fraser "Ogg," one William Blair, the widow and heirs of the late Donald Smith deceased, and then again of the said association to the bridge at New Glasgow, and passing under the western end of the said bridge, thence to run through, over and within the lands of the said Association, one Donald Fraser, mason, one Thomas Fraser, one Edmund Walter Remdell, one Donald McKenzie, one William McIntosh, Messrs. Simon James and John Fraser, again other land of the said Association; Messrs. George and John Fraser, one William McRay, again more land of the said association; one Alexander McDonald, one Donald Fraser, the widow and heirs of the late Colin Fraser deceased, and Messrs. Robert and William Dunbar, and from the said Robert and William Dunbar's lands into the said East river, to a point opposite the said loading ground, according to the said plan, allowing for the purpose of opening and making the said rail road so much of the land on each side of the said line not exceeding more than five nor in any case less than three rods in the whole breadth thereof, clear of fences and ditches, except at such places as the said line shall or may pass into or out of the waters of the said river, as may be requisite and necessary for the formation of a proper rail road, when so extended as aforesaid, and we have assessed the damages to be paid by the said trustees of the said Association to the owner or owners, tenant or tenants of the said lands, according to their several interests therein, or to such other person or persons as may be lawfully entitled to receive the same, for being deprived of the use and benefit of such land, and for the injury that may be done thereto, and for the expense which may be imposed on them for making fences or ditches, for the purpose of separating all the lands so laid off as aforesaid from other parts of the tracts of land, within which the lands so laid off are contained as follows: that is to say, for damages and fencing on and over the land now in the possession of the said Robert and William Dunbar, seventy-three pounds ten shillings, and for the like, &c., &c., all which said sums are to be lawful money of Nova Scotia, and to be paid to the person or persons entitled thereto as aforesaid by the said trustees of the

said Association, when and so soon as the said line of railroad is commenced and the fences put up in a lawful manner.

And we have also fixed and ascertained the annual rent for the use and occupation of the said lands, laid off as aforesaid as follows, that is to say, for so much thereof clear of any fences or ditches as shall be requisite and necessary for the purpose of the said rail road, when so extended as aforesaid, the same to be ascertained by actual measurement by a sworn deputy surveyor of land when the said rail road is formed, which is now in possession of the said Robert and William Dunbar, &c., &c., the annual rent of four pounds for each and every acre and so in proportion for any lesser quantity that may be requisite, &c. (N.B.—Other lots are at two pounds, two pounds ten shillings, three pounds, five pounds), which said sums hereby fixed for rent, being also of like lawful money as aforesaid, and to be paid by the said trustees in twelve months from and after the time when the proceedings had or be had under the said precept shall have been confirmed, and soon yearly and each year thereafter, so long as they continue to occupy the said rail road. Provided always that such owner or owners, tenant or tenants, or such other person or persons entitled to receive such annual rent as aforesaid, do and shall from time to time, and at all times hereafter, so long as the said line so laid off and marked as aforesaid shall be held and occupied as aforesaid, at his or their expense, cost and charges, repair and keep in repair all such fences as he, she, or they are bound to put up in manner aforesaid, and in default thereof the said association shall be at liberty to repair and keep in repair all such fences, and retain out of the annual rent aforesaid the reasonable expense and cost of the same. \* \* \* And we have further considered that there shall be made at the expense of the said Association, either across or under the said rail road, when the same is formed and completed, suitable and commodious places for the owner or owners, tenant or tenants respectively of the several tracts of land through, over or within which the said line for the said rail road has been laid off and marked as aforesaid, to pass and repass from one part of the said tracts of land to the other, the said passing places to be in such part of the said line as will admit of their being made by a bridge at least fourteen feet above the level of the rails to be laid on the said road, or at such other part thereof as will admit of their being made to pass under the said line of rails, and to be at least ten feet clear, at the option of the owners, of the soil opposite thereto, and in case there shall not be on any of the said tracts of land an embankment of sufficient height or cutting of a sufficient depth, to admit of a passing place to be made as before described, then there shall be made as aforesaid one at such place on the said line, as there shall be neither a cutting nor embankment of more than three feet, such place to be pointed out by the owner opposite, and we further consider the number of said passing places shall be as follows, &c.

In witness we have hereto subscribed our names at the house of James Fraser, Innkeeper, at New Glasgow, this eighth day of May, one thousand eight hundred and thirty-four, having been three days engaged in this business, to us referred as aforesaid, in the presence of the said John W. Harris, who has subscribed his name hereto.

(Signed) Alex. McDonald.

his  
George x Gratto.

mark  
John Adamson.

Peter McLaughlan.

Joseph Trinniman.

his  
James x Prerin.

mark

William Wylie.

Donald McGilveray.

Duncan McDougall.

John Lippincott.

Edward Patterson.

Jas. Purvis.

John W. Harris.

Depy. Sheriff.